**Modeling Climate Online Part 3**

*1.1.1 Outline the concept and characteristics of system*

*1.1.2 Apply the systems concept on a range of scales.*

*1.1.6 Define and explain the principles of positive feedback and negative feedback*

*1.1.8 Distinguish between flows and storages in relation to systems*

*1.1.9 Construct and analyze quantitative models involving flows and storages in a system*

*1.1.10 Evaluate the strengths and limitations of models*

*2.5.4 Describe and explain the transfer and transformation of materials as they cycle within an ecosystem*

*6.1.1 Describe the role of greenhouse gases in maintaining mean global temperature*

*6.1.2 Describe how human activities add to greenhouse gases*

*6.1.4 Discuss the feedback mechanisms that would be associated with an increase in mean global temperature*

**Go to the six-eight segments on** [**http://concord.org/activities/modeling-earths-climate**](http://concord.org/activities/modeling-earths-climate)

**Ice in the Earth System**

1. What happens when energy from the sun encounters a white surface such as ice or snow?

2. Describe how changes in the amount of ice covering Earth’s surface can affect Earth’s temperature.

3. What would the Earth’s climate be like if the albedo of ice were close to 0? Describe your results.

4. What would the Earth’s climate be like if the albedo of ice were close to 1? Describe your results.

5. Compare the results of your experiments.

6. Is the remaining ice melts, what could that mean for Earth’s climate?

7. Draw a systems diagram of ice’s relationship to the sun.

8. Is this positive or negative feedback? Explain your answer.

**Clouds**

1. How do the changes in cloud cover affect Earth’s temperature?

2. Draw a graph to demonstrate this relationship.

3. How do energy packets interact with the clouds to cool the Earth?

4. Explain why this is an example of negative feedback.

**Clouds & Ice Interactions**

1. How might this trend affect the Earth’s temperature in 2100? Explain.

2. How certain are you about your prediction? Explain your level of uncertainty.

3. Is this an example of positive or negative feedback? Explain your answer.

4. How is this a good model?

5. How is this a poor model?